

**Notice of Allowability**

Application No.

10/649,351

Examiner

Cheung Lee

Applicant(s)

LEE ET AL.

Art Unit

2812

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the Amendment filed on 5/3/06.
2. ☒ The allowed claim(s) is/are 1-13, 15-29 and 32-35.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some\* c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date 5-3-06 and 7-3-06
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date \_\_\_\_\_.
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_.

**MICHAEL LEBENTRITT**  
**SUPERVISORY PATENT EXAMINER**

**DETAILED ACTION**

***Notice to Applicant***

1. Applicants' Amendment and Response to the Office Action mailed on December 30, 2005 has been entered and made of record.

***Response to Amendment***

2. In view of applicants' amendment to the claims, the rejection of claim 15 under 35 U.S.C. 112, second paragraph, has been withdrawn.
3. In view of applicants' amendments and arguments filed on May 3, 2006, the rejections of claims 1-13, 15-29 and 32-35 under 35 U.S.C. 103(a) as stated in the indicated Office Action have been withdrawn.

***Reason for Allowance***

4. Claims 1-13, 15-29 and 32-35 are allowed.

The following is an examiner's statement of reasons for allowance: claim 1 recites depositing a tungsten cap layer having a thickness between about 50 and 200 angstroms on the tungsten bulk layer using a pulsed nucleation layer (PNL) deposition technique. Claim 9 recites depositing the tungsten nucleation layer comprises performing at least one pulsed cycle prior to flowing nitrogen, performing one or more pulsed cycles in the presence of nitrogen, and shutting off the nitrogen flow prior to the final pulsed cycle. Claim 19 recites forming an initial boron layer on the semiconductor substrate; contacting the substrate with a tungsten-containing precursor that is reduced

to form a tungsten layer on the semiconductor substrate; contacting the semiconductor substrate with a silane to form a layer of silane. These features in combination with the other elements of the claims are neither disclosed nor suggested by the prior art of record.

Claims 2-8, 10-13, 15-18, 20-29 and 32-35 variously depend from claims 1, 9 or 19, so they are allowed for the same reason.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cheung Lee whose telephone number is 571-272-5977. The examiner can normally be reached on Monday through Friday from 8:30AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Lebentritt can be reached on 571-272-1873. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Cheung Lee

July 11, 2006



**MICHAEL LEBENTRITT**  
**SUPERVISORY PATENT EXAMINER**